

ART. XIII.—*Supplementary Notes on the Diabase Rocks
of the Buchan District.*

BY A. W. HOWITT, F.G.S.

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ON a former occasion I laid before the members of this Society a paper on the Diabase rocks of the Buchan district.* I was unable to speak at that time with desirable confidence as to the exact position and character of some of the formations which I found at Murendel South. Since then, however, I have taken occasion to carry out further examinations, and to collect materials for microscopic analysis of the rocks. The results are embodied in these notes and in the accompanying diagram section. I hope thereby to make my former account of the Upper Buchan beds somewhat more complete.

For convenience of treatment I have arranged my subject under the following sections:—

The Quartz Porphyrites.—The lowest rocks which I found at Murendel South are rough-textured, often massive, and always dark-coloured (red or purple) igneous rocks. In some places I have also observed just such rocks forming the higher ridges, and in such cases their position is probably due to the extensive faulting which has effected the district. In the diagram section I show rocks of this kind at the level of the Murendel River, and also at the summit of the ridge marked (*k*).

The rocks at the place marked (*a*) and (*e*) are rudely bedded, and dip S. 30°—40° W. at about 15°. I prepared several thin slices of the samples I collected at (*a*) and (*e*).

The ground-mass in these slices is crypto-crystalline, and is apparently composed altogether of minute granules of felspar and quartz, with some intermixed felsitic basis, which also fills in certain spots almost exclusively. In other places

* Royal Society of Victoria, read 19th May, 1881.

the ground-mass becomes coarser in its elements, and the basis disappears.

In the ground-mass there are numerous fragments of quartz crystals, but these are "eroded," as is so frequently the case with quartz crystals in rocks of the quartz porphyry or quartz porphyrite classes, as, for instance, in those I have lately described from Noyang.*

I observed in some slices more than in others porphyritic feldspars, as well as quartz crystals. These feldspars have been so much altered that it is difficult to speak with absolute certainty as to what some of them have been. Some are converted into a saussurite-like compound, others are kaolinised and infiltrated by iron ore; but after a careful examination and comparison I have come to the conclusion that the majority of these porphyritic feldspars were plagioclase.

I have not observed either mica or hornblende. The general red colour of these rocks is due to their being permeated by ferric hydrate, which is a secondary product.

According to the above definitions these rocks belong to the quartz porphyrites.

Somewhat to the north of the high point marked (*k*) in the diagram section, I have found an outcrop of rocks in one of the gullies leading to the Murendel River. The samples which I collected prove upon examination to belong to this section of my description. They are harsh textured rocks of a dark colour, inclining to grey or olive. They dip S. 10° W. at about 15° , and they appear to be bedded lavas, for I observed in them very numerous vesicles drawn out in a direction not quite that of the dip, indicating movements in the rocks when they took up their present positions. I found by the examination of thin slices that this rock has a ground-mass composed of quartz and feldspar in variable proportions. In one part of a slice I also observed a mass of brown glassy basis enclosing portions of the micro-crystalline granular materials.

In this ground-mass there are very numerous quartz crystals, one of which is eroded and filled in by it in the characteristic manner. I found also several porphyritic crystals of feldspar, in some of which I could observe the twin structure of the triclinic feldspars. As a rule, these feldspars are too much altered for their original

* Royal Society of Victoria, read 10th May, 1883.

character to be seen. I have not observed any crystals of mica, or of hornblende, nor any alteration products which I could refer to those species, unless it were some slight traces of chloritic minerals.

This rock may, with some reasonable certainty, be referred to the quartz porphyrites, and I feel little doubt that it represents the former condition of the "red rocks" which I have just before described.

The Diabase Rocks.—Resting upon the red porphyrites there is a considerable thickness, perhaps 200 feet, of Diabase rocks. The lowest of these lies on the porphyrites, but I cannot feel sure that they are entirely conformable in dip to them.

The lowest Diabase rocks which I could examine are those indicated at (*d*), and they are a good example of the Diabase tuffs of the district, containing also rounded fragments of the underlying red porphyrites. These tufas are so friable and so much altered that none of the samples I collected would admit of a thin slice being prepared for examination.

It is in a continuation of these fragmental beds that the adit of the now long-defunct Murendel South Mining Company was driven, at the place where the beds are cut off by a strong north and south nearly vertical fault, which I have shown on the diagram by (*x*).

The heaps of stuff brought out of this adit during the time it was being worked show that the rocks adjoining the fault are much more altered than those at a little distance, and that they have been slightly enriched by deposits of lead and copper, and massed together by a good deal of red jasper and chalcedony.

The rest of the Diabase upwards from (*c*) consists of bands of various texture, some being fragmental and others compact. The latter show along the steep hill sides in several strongly marked outcrops.

I collected samples from the beds marked (*b*) and (*c*) and also at the place (*h*).

On examining thin slices I found all to have the well-marked characters of the Diabase porphyrites, as described by me in the previous paper. All that I need note is that enstatite is rare, seemingly, as I found it only in one slice, and that the samples taken from (*c*) near the fault contain olivine. These samples are much altered, and the olivine is converted more or less into a translucent, red micaceous

mineral (Rubellane), the final stage being to a hydrated ore of iron.* All these Diabase rocks belong to the same formation, and the same period of time as those I have described as occurring to the eastward of the Murendel River, and also at the Snowy River.

The Limestones.—On these Diabase rocks rest conformably about 150 to 200 feet of the Buchan limestones. I collected and examined examples from the places marked (f) and (g).

These are all composed mainly of carbonates, whose yellow colour indicates the presence of iron among their bases. The carbonates are confusedly aggregated together as masses of rhombic crystals, including numerous angular fragments of quartz crystals, and of pieces of more or less altered porphyrite rocks. Here and there spaces are filled in by chortitic minerals.

These limestones, without doubt, represent the passage beds which I have before described as connecting the upper and lower divisions of the Buchan beds.

The Faults.—The group of formations which I have now briefly described are cut off on the western side by a double fault shown upon the diagram section as (x)—(x¹). The eastern fault of the two is, I suspect, a continuation of that on which the workings of the Murendel Mine have been carried on.

Such faults as these seem to be common in the district. Perhaps to speak more correctly, I might say that such faults are more easily recognised in the Buchan district, where the succeeding formations differ so much from each other than in other parts of North Gippsland, where are found only the Silurian series, and the igneous rocks which have intruded into it.

The faults at Murendel seem to me to have an essential relation to the ore deposits. In their neighbourhood the rocks of whatever kind are seen to have been more or less altered. The quartz porphyrites have been least affected; the Diabase rocks most so; and the limestones have, as a rule, been bleached and crystallised. All the rocks traversed by these faults near Murendel have been more or less impregnated with ores of various metals, and in certain places the deposits of ore have been such as to induce mining companies to attempt working them.

* See *Progress Report, No. 5, Geological Survey of Victoria*, p. 143.

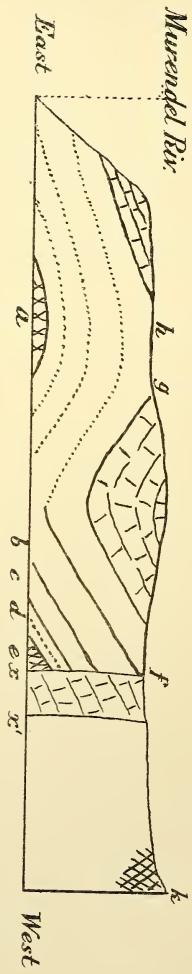






Diagram Section at Murendel South

Approximate Scale, 500 Ft. to one Inch

-  Buchan Limestones
-  Diabase Porphyrites
-  Diabase Tuffas
-  Quartz Porphyrites